

# Protein Kinase C Epsilon (PKC $\epsilon$ ) involvement in Nicotine Addiction



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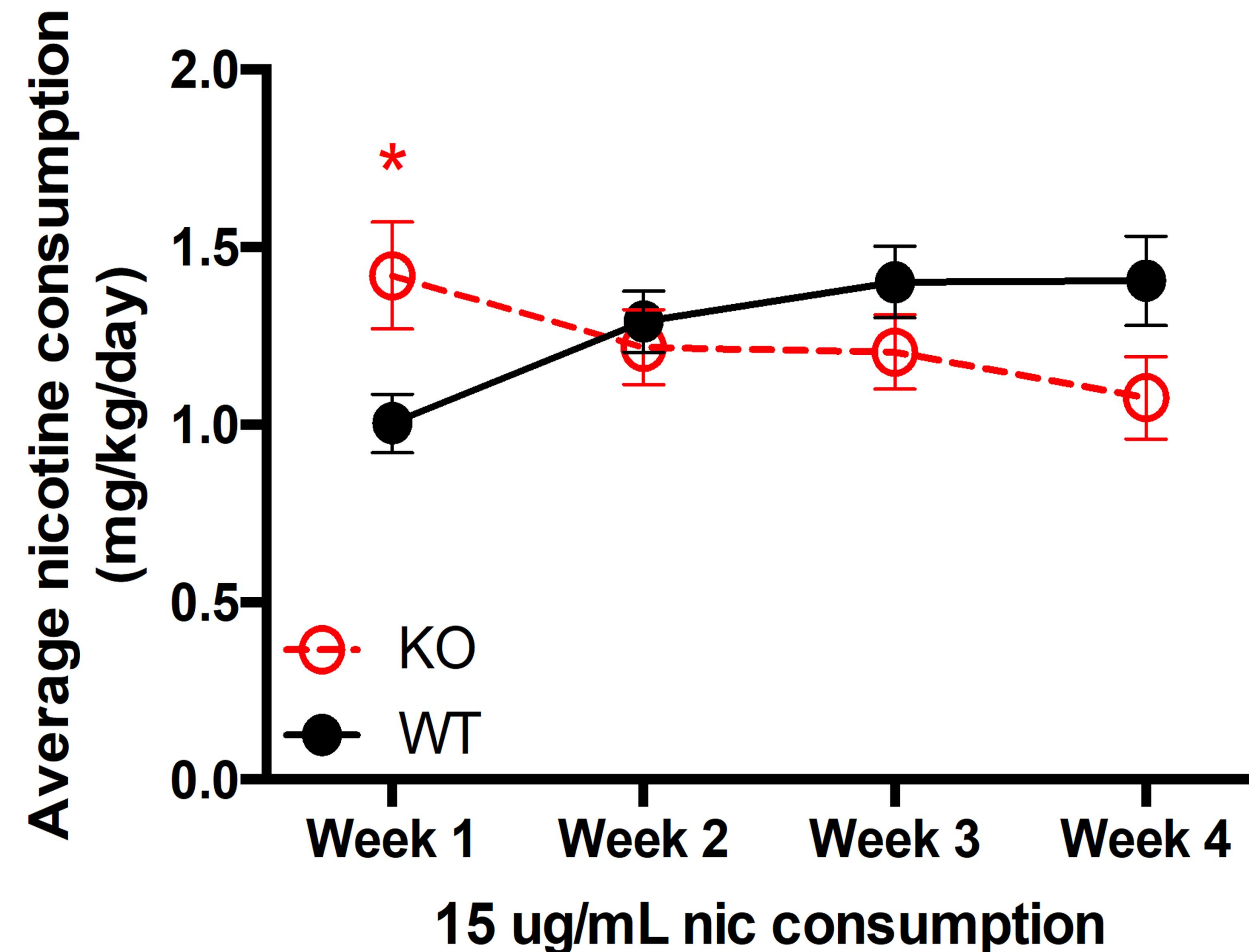
## Background

- Alcohol and nicotine addiction are often co-morbid
- The current annual costs associated with nicotine addiction is 300 billion<sup>1</sup>
- Neuronal nicotinic acetylcholine receptors (nAChRs) are involved in the mechanisms of drug action and are found throughout the central nervous system (CNS)<sup>2</sup>
- The brain reward system is comprised of dopaminergic neurons that are found in the ventral tegmental area (VTA) that release dopamine in the nucleus accumbens (Nac)<sup>3</sup>
- Nicotine can interact with nAChRs and the brain reward system to produce rewarding, and addictive, effects<sup>4</sup>
- Protein kinase C (PKC) are a family of enzymes that are believed to modulate drug addiction<sup>4</sup>
- PKC $\epsilon$  is involved in many CNS signaling pathways and is known to act upon nAChRs
- Previous studies have shown male mice with the deletion of the PKC $\epsilon$  gene have reduced nicotine consumption. Therefore, PKC $\epsilon$  may be a good drug target to reduce nicotine consumption in males.<sup>4</sup>
- The role of PKC $\epsilon$  in nicotine addiction in female mice has not been previously investigated
- Our work suggests a sex by genotype difference exists in the contribution of PKC $\epsilon$  in nicotine consumption

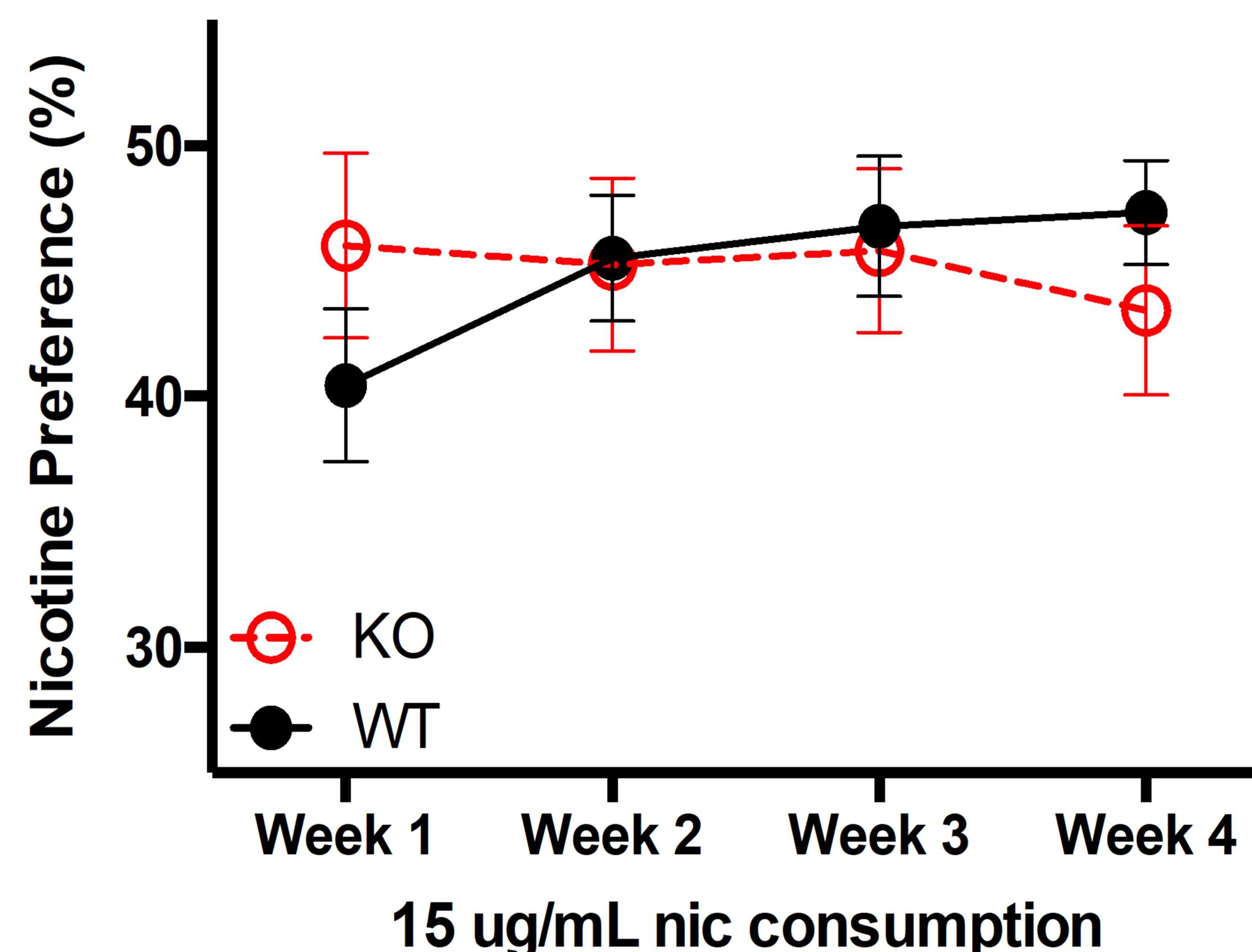
## Acknowledgements

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## Female PKC $\epsilon$ Knock- Out Mice Consumed More Nicotine Compared to Wild-Type Mice in the First Week of the Experiment



## Nicotine Preference Between Genotypes was not Significantly Different over the Four Week Experiment



## Methods

### Continuous Access 2-Bottle Choice:

Female PKC $\epsilon$  wild-type (n= 35) and knockout mice (n= 30) were presented with a water bottle containing 2% Saccharine, and a nicotine bottle containing a solution of 2% Saccharine and 15 $\mu$ g/mL nicotine. The bottles were presented to the mice for four weeks. There were no changes in nicotine concentration presented over the four weeks of measurements.

**Statistical Analysis:** Average daily nicotine (mg/kg/day) was calculated based on the differenced in weights of the bottles and weights of each mouse. Nicotine preference was also determined. The consumption data was compared using 2-way repeated ANOVA with multiple comparisons.

## Summary and Conclusions

- Female PKC $\epsilon$  knock-out mice consumed more nicotine compared with wild-type mice in the first week.
- Thereafter, female PKC $\epsilon$  knock-out mice had similar nicotine consumption compared with wild-type mice.
- Our results indicate that a sex by genotype difference exists in the contribution of PKC $\epsilon$  to nicotine consumption
- These results contribute may play a role in future development of treatment options for nicotine addiction.

## References

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